

# An analysis of the Genus *Miletus* (Hübner) (Lepidoptera : Lycaenidae)

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## Introduction

HITHERTO THE ONLY complete analyses of the genus *Miletus* Hbn. (= *Symetha* Hsf., 1828; *Gerydus* Bsdv., 1836) are those attempted by Fruhstorfer (1913/14 and 1915). These were based on superficial characters and contained many errors. Evans (1932) and Corbet (1939, amended 1940 and 1956) published keys for the Indo-Burmese and Malayan species respectively.

Corbet's treatment of the Malayan species was based on the ♂ genitalia. However he seems to have made only a few preparations, and his figures were drawn in some cases from examples distorted by mounting on flat slides and with the clasps not always arranged in the same relative position. In consequence he did not, in my opinion, recognise the important diagnostic features of the genitalia, and several of his figures are highly misleading. I cannot agree with his division of the species into four groups.

In the present attempted analysis I have been at a great advantage over earlier revisers in being able to make use of a much larger material, due to the recent amalgamation of the material at Tring with that already in the British Museum (Natural History)—hereafter referred to as B.M. This has enabled me to examine the genitalia of virtually all forms whose status appeared open to question and to get a good idea of the extent of individual variation.

## Genitalia

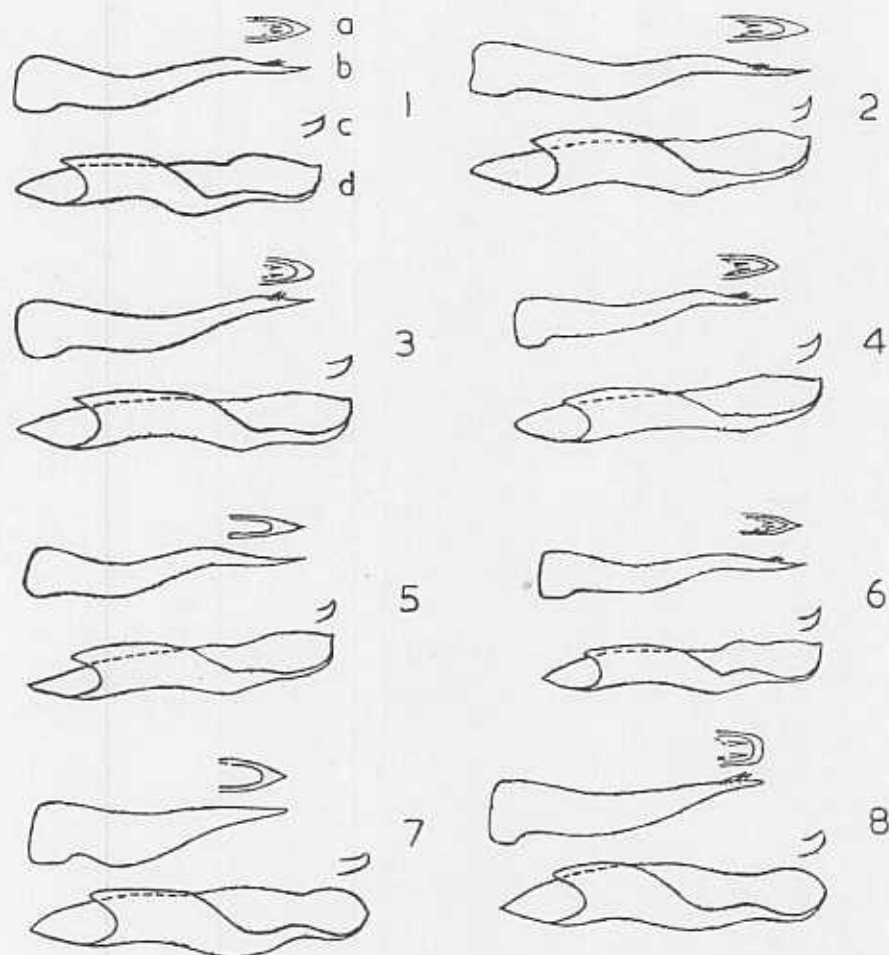
I recognise five natural groups of species based on the characters of the clasp—these characters being easier to see than to describe. Within each group the best specific characters, where such exist at all, are usually to be found in the aedocagus, in particular in the dorsal aspect of its distal end.

**Group 1.** Outer 1/3 of clasp roughly subspathulate (i.e. dorsal margin much less strongly convex than ventral margin) with an incurved terminal hook lying well above the centre line of the clasp: *chinensis* group comprising *chinensis*, *croton*, *mallus*, *gaesa*, *nymphis*.

**Group 2.** Outer 1/3 of clasp approximately spathulate, so that the terminal hook, which is shorter and blunter than in Group 1, lies more or less in the centre line of the clasp: *zinckenii* group comprising *zinckenii*, *gopara*, *valeus*, *gaetulus*.

**Group 3.** Outer 1/3 of clasp roughly rectangular, with the final part of the dorsal and ventral margins folded inwards at right angles to the axis, so that the distal margin of the clasp, viewed longitudinally, looks like the letter U: *boisduvali* group comprising *boisduvali*, *drucei*, *biggsii*, *cellarius*.

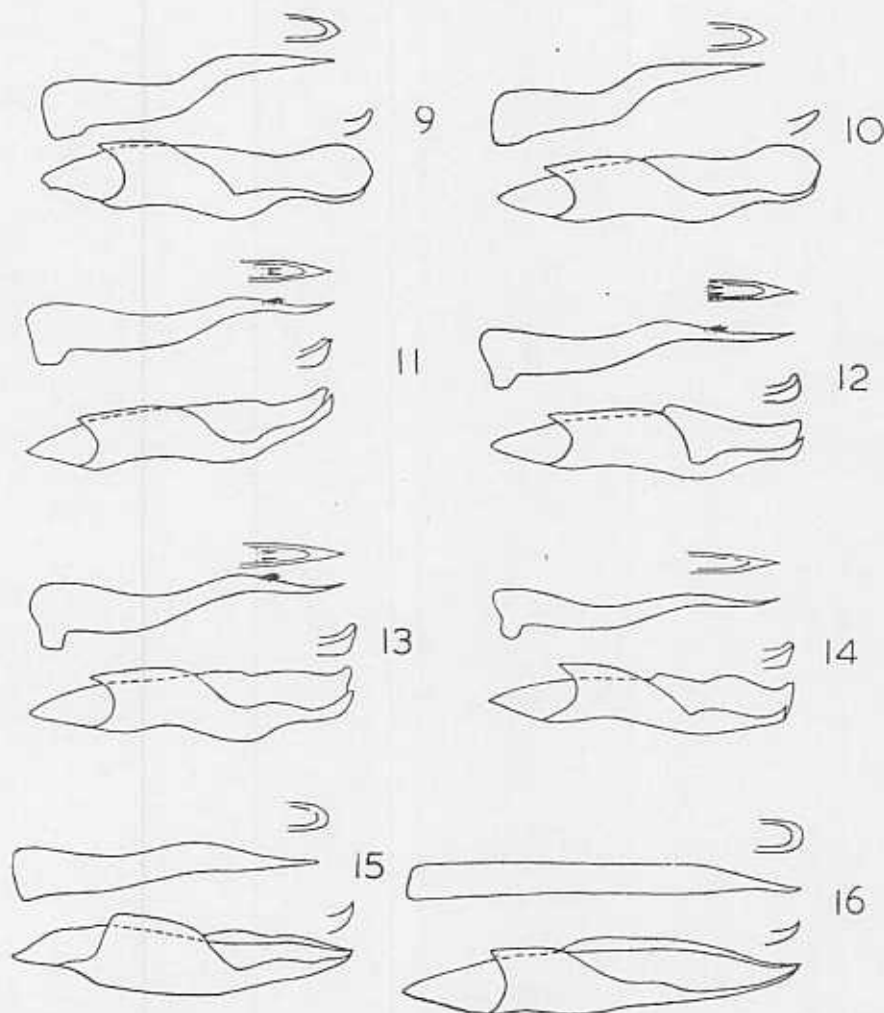
**Group 4.** Outer 1/3 of clasp with narrow lateral folding and tapering more or less evenly to an incurved terminal hook: *symethus* group comprising *symethus*, *gallus*, *heracleion*, *ancon*, *archilochus*, *leos*, *celinus*.



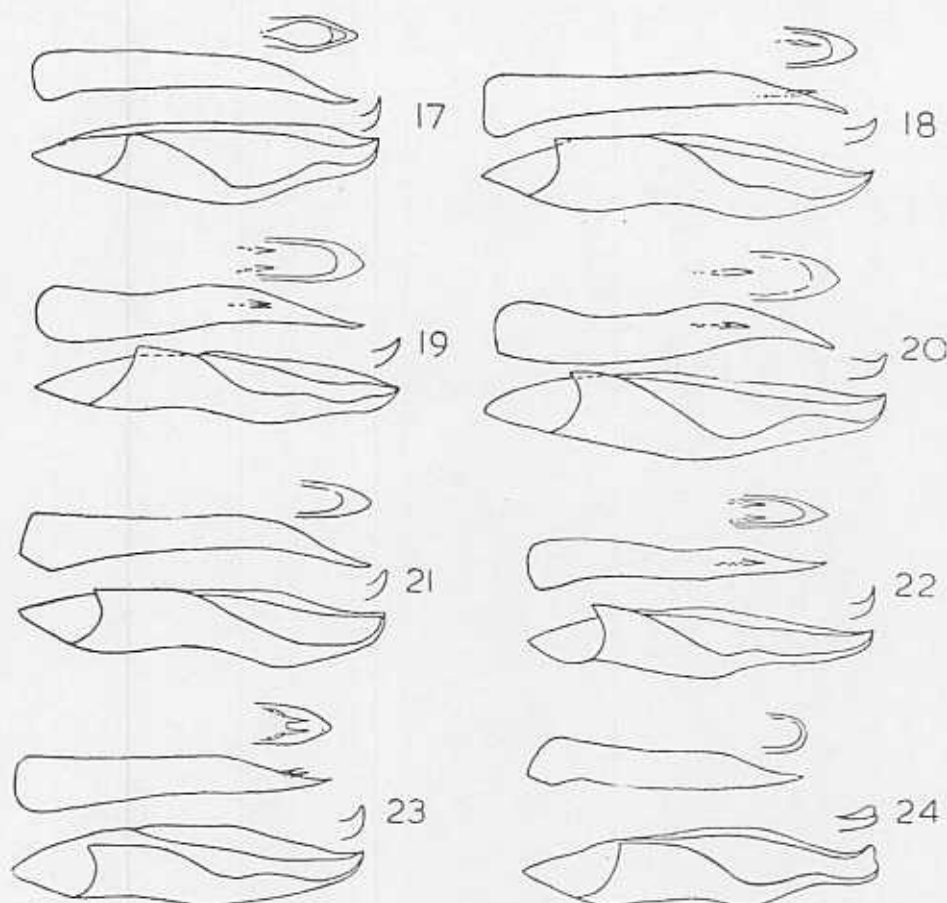
Figs. 1-8. (a) dorsal view of distal end of aedeagus, (b) lateral view of aedeagus, (c) distal end of clasp to show maximum incurvature, (d) lateral view of clasp of:—(1) *M. chinensis longiana* (Nic.) (Manipur); (2) *M. croton croton* (Doh.) (Dawnas); (3) *M. mallus shania* (Evans) (N. Siam)—aedeagus unusually blunt and short; (4) *M. nymphis porus subsp. n.* (Karen Hills); (5) *M. nymphis porus subsp. n.* (Mergui, King Is., i. 1926, W. H. Evans)—unique small aberration with v 4 on F strongly swollen and slightly aberrant genitalia (? sp. n.); (6) *M. gaesa gaesa* (Nic.) (Malaya); (7) *B. zinckenii zinckenii* C. and R. Feld. (Java); (8) *M. gopara gopara* (Nic.) (Malaya).

**Group 5.** Clasp resembling Group 4 throughout most of its length but ending in a bifid process: *melanion* group comprising only *melanion*.

The clasp in *Miletus* is characterised by a folded-over "flap" in the basal half. This "flap" is continued by a very weakly sclerotised and rather narrow extension which slopes backwards to form a  $\pi$ -shaped junction with the corresponding extension of the other clasp behind the vinculum, thus forming a guide for the aedoeagus. For simplicity this extension has been omitted from the accompanying figures, and only the clasp proper has been shown. The setae densely clothing the distal end of the clasp have also been omitted. Corbet's figures (1938) are similarly simplified.



Figs. 9-16 (for lettering refer to Fig. 1). (a) dorsal view of distal end of aedoeagus, (b) lateral view of aedoeagus, (c) distal end of clasp to show maximum incurvature, (d) lateral view of clasp of:—(9) *M. gaetulus innocens* (H. H. Drc.) (S. E. Sumatra); (10) *M. valeus* (Fruh.) (Malaya); (11) *M. boisduvali boisduvali* Mre. (Java); (12) *M. biggsii biggsii* (Dist.) (Malaya); (13) *M. cellarius* (Fruh.) (N. Borneo); (14) *M. drucei metrovius* (Fruh.) (N. Borneo); (15) *M. symethus petronius* (Dist. and Pryer) (Malaya); (16) *M. leos maximus* (Holl.) (S. Celebes).



Figs. 17-24 (for lettering refer to Fig. 1). (a) dorsal view of distal end of aedeagus, (b) lateral view of aedeagus, (c) distal end of clasp to show maximum incurvature, (d) lateral view of clasp of:—(17) *M. celinus* sp. n. (S. Celebes); (18) *M. ancon siamensis* (Godfrey) (W. Siam); (19) *M. ancon gigantes* (Nic.) (Malaya); (20) *M. ancon gigas* (H. H. Drc.) (N. Borneo); (21) *M. archilocheus* (Fruh.) (Tonkin); (22) *M. gallus gallus* (Nic.) (Malaya); (23) *M. heracleion arion* subsp. n. (N. Borneo); (24) *M. melanion melanion* C. and R. Feld. (Mindoro).

#### Individual Variation

**Facies.** In several species which carry a white band on the forewing there is very great individual variation in the extent and character of this band. For example in *M. biggsii biggsii* (Dist.) the band may vary in the ♂ from being comparatively broad and clear white to being much constricted, especially towards the tornus, and sullied with dark brown scales. In the ♀ variation follows generally similar lines, though sulling of the band is most highly developed along veins 2 and 3, whereas in the ♂ it is more evenly spread. In both sexes examples which have the white band well-developed have the forewing apical area dark blackish brown, contrasting strongly with the paler ground colour of the hindwing. As the white band becomes more reduced and sullied there is a corresponding lightening of the apical area, so that in extreme examples the

apical area contrasts little, if at all, with the hindwing. The lightest forms can be connected to the darkest by a complete series of intergrades which, as my own collecting experience has proved, are independent of climate, season or environment, since all may be found flying together at the same time and place. Furthermore no particular degree of variation appears to be noticeably commoner than any other, except that there seems to be a tendency in this species, as in others, for example from N.E. Sumatra to average darker than those from other localities. We have here, then, a cline of individual graded variation, in which it would be illogical to single out any particular stage as a valid "form". Unfortunately some previous authors, working probably with an inadequate material at their disposal, have given either form or subspecific rank to arbitrary stages on the cline or have even attributed them to more than one species. I consider that such names have no nomenclatorial validity, and in the section "Annotated List of the Species and Subspecies" I have treated them as synonyms of the name first applied to the geographical subspecies. In cases, however, where a geographical subspecies occurs in two or more well-defined "varieties", which appear to be independent of season and in which intergrades occur only very seldom, it seems to me justifiable that they should be separated as named forms. In the case of *Miletus* I recognise only one such instance, namely in the North Moluccan subspecies of *M. leos* which occurs in easily separable dimorphs—*f. virtus* (with a well-defined white band in both sexes) and *f. pentheus* (narrower, sullied band in  $\delta$ , unmarked in  $\varphi$ ).

**Venation.** In the  $\delta$  of certain species the basal portion of vein 4 of the forewing is thickened. Generally this is a good specific character, but in *gaesa* it is subspecific and in *nymphis* it is both individual and subspecific. The thickened portion of vein 4 is usually devoid of normal scales but is clothed with minute wedge-shaped specialised scales, which require a high magnification for their examination. I have not detected any specific differences in these scales, but I have not carried out a full investigation.

**Genitalia.** Individual variation is slight, and is normally confined to small variations in the length and stoutness of the aedocagus.

**Seasonal.** Variation is usually extraordinarily marked in Upper Burma, and only a little less so in N.E. India. Elsewhere it is much less marked or absent. As a general rule any white or pale markings on the upper surface become enlarged in the dry season form. In addition, in the species of the *chinensis* group, the undersurface of the dry season form becomes suffused with reddish brown, whilst on the hindwing the discal band is inwardly bordered by a blackish area.

#### Geographical Variation

A peculiar feature of the genus is that in *Neomalaya* geographical variation in facies is normally at its most pronounced between, on one hand, North Sumatra and, on the other, Central and South Sumatra. No doubt a cline occurs where these two extremes meet. Sumatran material in the B.M. is not equally representative of all parts of the island, but my impression is that any cline will prove to be a steep one occurring only in a limited territory. In general, examples from Western Java, which might be expected to resemble examples from the adjacent parts of Sumatra, are in fact much closer to North Sumatran examples. Bornean examples are usually very similar to South Sumatran examples, but with the white markings a little less strongly developed. Malayan examples are often inseparable from North Sumatran examples, but white markings average a little more fully developed. I can offer no explanation for these facts.



## Status of certain species

Within the five genitalia groups the correct status of certain forms which I have treated as species is open to argument.

In the *boisduvali* group all four "species" have similar genitalia. Throughout most of the Malaysian archipelago *boisduvali*, with the forewing unmarked brown, alone occurs; in the Philippines it is replaced by *drucei*; only *biggsii* occurs in Malaya; in Sumatra *biggsii* is the common form, but it appears that *boisduvali* also occurs very rarely (possibly in the South only); *cellarius* is confined to Borneo. The three "species" *drucei*, *biggsii* and *cellarius* are explicable as having diverged from *boisduvali* in geographical isolation in the Philippines, Malaya/Sumatra and Borneo respectively. In each of these territories there must have been factors favouring differential development of white markings on the ♂ forewing which were absent throughout the rest of the Malaysian archipelago, where conditions of geographical separation would appear to have offered much greater opportunities for variation. As all four "species" now occur together in Borneo without apparent intergrades it seems preferable to regard each as a distinct entity.

The "species" *valeus* and *gaetulus* have similar genitalia. Both were taken by Dr. Martin's collectors in N.E. Sumatra in the same month of the same year, though *valeus* was collected only at low elevations and *gaetulus* only in the mountains. It is possible, therefore, that in Sumatra they are lowland and montane forms of the same species. My collecting experience in Malaysia has, however, led me to doubt the influence of altitude in producing variations of so marked a nature. Moreover I have seen *valeus* from the mountains of Malaya.

I have followed Corbet with some hesitation in placing *gigantes* as a subsp. of *ancon*. Its appearance is very different and there seems to be a slight but constant difference in the genitalia; in the *ancon* forms (including Bornean *gigas*) which I have examined the cornutus consists of a single spine, whereas in *gigantes* the usual two spines are present. However, in the absence of proof that the two occur anywhere together, it seems preferable at present to treat them as conspecific.

The genitalia of Siamese *ancon* and Tonkinese *archilochus* are very similar and though their areas of distribution approach each other fairly closely there is as yet no evidence that they overlap. However in this case I consider that the differences in facies are too great, both in degree and kind, for conspecificity to be probable.

All the species of the *chinensis* group have similar genitalia, but I have no doubt of the specific status of the "species" I have listed. Both Evans and Corbet regarded *longeana* as a good species, whereas I treat it as a subspecies of *chinensis*. The B.M. contains a few examples of *chinensis assamensis* labelled from what is properly *longeana* territory. However the prevalence of intermediate forms where *longeana* meets neighbouring *chinensis* races leaves no doubt in my mind that they all belong to the same species.

More material is needed to decide whether *hierophantes* (Fruh.) is specifically distinct from *symethus* (Cr.).

Keys to the species of *Miletus*

I have found it impossible to prepare a single key, based only on superficial characters, to all the species without splitting up the natural groups defined above on the ♂ genitalia. I have, therefore, prepared separate keys for each group, and in cases where

a species of one group is superficially similar to a species of another group (e.g. *boisduvali* and some subsp. of *chinensis*) I have drawn attention to minor points of difference in the appropriate paragraphs of the following section "Annotated list of the species and subspecies."

The following abbreviations have been used:—

F = forewing, H = hindwing, Up = upperside, Un = underside, v = vein, wsf = wet season form, dsf = dry season form. ♂ F 15–20 mm. means that the length of forewing, measured from thorax to apex, in the ♂ examined by me, varies between 15 and 20 mm.

#### KEY TO THE CHINENSIS GROUP

- 1 (2). ♂ UpF v 4 always strongly swollen near base, and devoid of normal scales .... *chinensis*.
- 2 (1). ♂ UpF v 4 at most only weakly swollen, and may be partly or wholly covered with normal scales.
- 3 (6). ♂ UpF v 4 never swollen. ♂ ♀ UpF with white to whitish markings (which may be sullied in wsf) comprising a patch end cell and, usually, separate and narrower spots in spaces 1b and 2.
- 4 (5). Larger, ♂ F 20–24 mm. ♂ ♀ UpF spot in space 1b always smaller than spot in space 2. UnF white band decreases towards tornus. UnH blackish brown, with reddish brown bands ..... *croton*.
- 5 (4). Smaller, ♂ F 14–22 mm. ♂ ♀ UpF spots in spaces 2 and 1b usually equal. UnF white band extends to base, or nearly so, in spaces 1a and 1b. UnH greyish brown to buff brown in wsf, but suffused reddish in dsf ..... *mallus*.
- 6 (3). ♂ UpF v 4 may be unswollen or weakly swollen. ♂ ♀ UpF not so marked.
- 7 (8). ♂ UpF 12–17 mm., unmarked brown. ♀ UpF normal markings of *chinensis* group may be faintly discernible ..... *gaesa*.
- 8 (7). ♂ ♀ UpF 12–19 mm., with a continuous and more or less even white band .... *nymphis*.

#### KEY TO THE ZINCKENII GROUP

- 1 (4). ♂ UpF v 4 strongly swollen near base and devoid of normal scales.
- 2 (3). ♂ UpF outer edge of white band angled at v 3 and portion in spaces 1b and 2 at right angles to dorsum. ♀ H termen normal ..... *zinckeni*.
- 3 (2). ♂ UpF outer edge of white band straight, regular and oblique from v 1 to v 4, thence angled towards base. ♀ H termen prominently toothed at v 4 ..... *gopara*.
- 4 (1). ♂ UpF v 4 not swollen and always completely covered with normal scales.
- 5 (6). ♂ ♀ UpH unicolorous brown ..... *valeus*.
- 6 (5). ♂ ♀ UpH mostly white ..... *gaetulus*.

#### KEY TO THE BOISDUVALI GROUP

- 1 (2). ♂ UpF unmarked brown, with a faint sepia tinge, except for usual narrow area of paler scales surrounding the thickened portion of v 4 ..... *boisduvali*.
- 2 (1). ♂ UpF with white markings (except *drucei* sometimes), which may be sullied.
- 3 (4) (5). ♂ UpF smoky brown, without the sepia tinge of *boisduvali*. White discal markings may be absent, or form a diffuse whitish spot beyond end cell in spaces 3 to 5, or may extend into spaces 2 and 1b commencing at the base of these spaces ..... *drucei*.
- 4 (5) (3). ♂ UpF always with a white discal band, which may be much sullied, not covering more than outer ½ of cell nor extending to base of spaces 2 and 1b ..... *biggii*.
- 5 (4) (3). ♂ UpF with broad white discal band which fills outer ½ of cell. Slightly larger and Un markings more clearly defined than preceding spp. .... *cellarius*.

## KEY TO THE SYMETHUS GROUP

- 1 (12). UnH discal markings in spaces 4 and 5 equidistant from termen and end cell, or nearly so. Confined to the west of Wallace's Line (except that *symethus* has reached Lombok).
- 2 (11). ♂ UpF with white or whitish markings.
- 3 (4). ♂ ♀ UpH always with bluish grey scaling on at least part of wing (except subsp. *hierophantes* which is brown with a white discal patch) ..... *symethus*.
- 4 (3). UpH may be brown, brown dusted with whitish, or white, but never with bluish grey scaling.
- 5 (10). ♂ ♀ UpF white discal band does not reach base.
- 6 (9). ♂ ♀ UpF inner edge white discal band not indented at v 3.
- 7 (8). Smaller, F 17-18 mm. UnH markings in cell and spaces 3 and 4 much darker than remaining markings ..... *gallus*.
- 8 (7). Larger, F 19-23 mm. UnH all markings of more or less same intensity ..... *heracleion*.
- 9 (6). ♂ ♀ UpF white discal band sharply constricted on its inner edge at v 3, and may be completely divided ..... *ancon* (less subsp. *gigantes*).
- 10 (5). ♂ ♀ Up all white except for dark apical area F and narrow costal area H ..... *ancon* subsp. *gigantes*.
- 11 (2). ♂ UpF unmarked brown. ♀ UpF with obscure, pale spots in spaces 4, 3, 2 and 1b, with their outer edges on an even arc. Large, F 21-24 mm. .... *archilochus*.
- 12 (1). UnH discal markings in spaces 4 and 5 much nearer to termen than end cell. Confined to the east of Wallace's Line.
- 13 (14). F termen and apex normal ..... *leos*.
- 14 (13). F apex hooked and termen highly convex in both ♂ and ♀ ..... *celinus*.

## Annotated list of the species and subspecies

For the sake of brevity references to the original descriptions have not been included in the following list. They can, however, be traced from the list of references at the end of this paper.

1. *M. chinensis* C. Feld.

Previous writers have confused this species with *boisduvali*, due to the superficial resemblance of the ♂ ♂ of the latter species with wsf ♂ ♂ of *chinensis*. In *boisduvali* the ♂ is plain dark brown, whereas in *chinensis* there are usually at least traces of white to whitish markings on UpF, which may be confined to very obscure, sullied post discal spots in spaces 1b and 2. In some specimens of *chinensis*, including the types of *learchus*, *irroratus* and *assamensis*, even these small spots are lacking, and in such cases dissection is the only certain means of identification. Dissection should not, however, be necessary in the case of reliably labelled specimens, as *chinensis* occurs only on the Asiatic mainland and *boisduvali* only in the Malaysian Archipelago. ♀ ♀ are easier to separate than ♂ ♂, the pale markings on UpF having their outer edges on an even curve in *chinensis*, whereas in *boisduvali* the outer edge of the pale markings in spaces 5, 4 and 3 is usually rather straight and oblique.

There are four subspecies:—

(a) subsp. *assamensis* (Doh.).

*Gerydus irroratus* var. *assamensis* Doherty, 1891a. ♂ (wsf) Dhansiri Valley, Assam. Type B.M. syn. *Gerydus boisduvali milvius* Fruhstorfer, 1913. ♀ (dsf) Sikkim. Type B.M.

The most distinctive feature of this subsp. occurs in the dsf which, in both sexes, is brown with well-marked white to yellowish markings, and with the F hooked at the apex and lobate at the tornus.

Hab. Kumaon to Assam.



(b) subsp. *longeana* (Nic.).

*Gerydus longeana* de Nicéville, 1898. ♂ (dsf) Hsipau, North Shan States.

In the wsf the pale markings are usually more pronounced than in subsp. *assamensis*. The dsf, in its extreme form flying from January to March, is usually all white in both sexes except for a dark apical area on F and costal area on H. In November–December, and again in March–April (but apparently less commonly), intermediate forms occur with a broad continuous white band on F, and the H pale yellowish brown, sometimes streaked with whitish. Wing shape as in subsp. *assamensis*.

Hab. Manipur and Chin Hills to Shan States and Karen Hills. Examples from the Naga and Lushai Hills are intermediate to subsp. *assamensis*, whilst examples from Upper Tenasserim and the Lower Irrawaddy Valley approach subsp. *learchus*. I do not know what form occurs in Arakan.

(c) subsp. *learchus* C. and R. Feld.

*Miletus learchus* C. and R. Felder, 1865. ♂ (wsf) "Luzon" recte Cochin China. Type B.M.

syn. *Miletus irroratus* H. Druce, 1874. syn.n. ♂ (wsf) near Bangkok. Type B.M.

syn. *Miletus archilochus kelantanus* Corbet, 1938. syn.n. ♂ ♀ Kelantan, Malaya. Types apparently lost. ♀ paratype B.M.

The wsf is hardly separable from *assamensis* wsf, and the dsf is only weakly developed. Examples from Lower Tenasserim and Siam usually have a more pronounced whitish discal area on UnF than examples from the type locality, whilst in Malaya no dsf occurs.

Hab. Indo-China, Siam, Lower Tenasserim and Northern Malaya.

(d) subsp. *chinensis* C. Feld.

*Miletus chinensis* C. Felder, 1862. ♂ Hong Kong.

The ground colour on Up is rather dark smoky brown, without the faint sepia tinge found in subsp. *learchus* which it otherwise much resembles.

Hab. Yunnan to S.E. China and Hainan.

2. *M. croton* (Doh.)(a) subsp. *corus* subsp.n.

♂ resembles subsp. *karennia* in having the white band on UpF outwardly evenly convex, but differs in that this band does not extend above v 6 and is narrower, not entering the cell nor reaching the base of space 3. The band in spaces 3 and 4 is 3–4 mm. wide in the dsf and 2–2.5 mm. wide in the wsf.

♀ resembles the ♂ except for the characteristic ♀ wing shape.

Hab. South Shan States and N.W. Siam. Described from 1 ♂ dsf Chiengmai, N.W. Siam, and 3 ♂ 1 ♀ dsf, 17 ♂ 2 ♀ wsf South Shan States (including holotype ♂ Kengtung District, Loi Mwe, 20.viii.1927 (ex Tytler coll.); allotype ♀ 20.x.1927, otherwise same data.).

(b) subsp. *karennia* (Evans).

*Gerydus croton karennia* Evans, 1932. ♂ Karen Hills. Type B.M.

The F white band reaches the costa, extends into the cell and nearly always reaches the base of space 3. There are in B.M. a ♂ and a ♀ of this subsp. from Thandaung, Karen Hills, labelled as the types of *croton*. These specimens do not agree with Doherty's original description, figure or locality, and cannot be accepted as authentic types.

Hab. Karen Hills.

(c) subsp. *croton* (Doh.).

*Gerydus croton* Doherty, 1889. ♂ (dsf) Tenasserim Valley.

syn. *Gerydus croton tavoyana* Evans, 1932. syn.n. ♂ (dsf) Tavoy. Type B.M.

The characteristic feature of this subsp. is that the outer edge of the F band is straight and oblique. The extent of the band is very variable, unlike the other subsp. which show much constancy. In the dsf it is normally rather narrow and sullied yellowish (as in Doherty's original figure of *croton*), but it may be wider and clear white and may even reach the costa and base of space 3 (as in the type of *tavoyana*). In the wsf the band is sullied and obscure and may even be wanting.

Hab. Lower Tenasserim. Examples from the Dawnas sometimes have the outer edge of the F band rather convex, thus showing an approach to subsp. *corus*.

3. *M. mallus* (Fruh.)

There are two doubtfully tenable subsp., which should perhaps be more correctly regarded as the opposite ends of a weak cline.

(a) subsp. *mallus* (Fruh.).

*Gerydus croton mallus* Fruhstorfer, 1913. ♂ ♀ (dsf) S. Annam. Types B.M., the ♀ allotype being a specimen of *M. chinensis learchus* Feld.

syn. *Gerydus gethusus* Fruhstorfer, 1915b. syn.n. ♂ (wsf) Tonkin. Type B.M.

A poorly marked subsp., the white F band being 2–3 mm. wide in space 3 in the dsf, and obsolete but faintly indicated by pale brown spots in the wsf.

Hab. Indo-China and S.E. Siam.

(b) subsp. *shania* (Evans).

*Gerydus gethusus shania* Evans, 1932. ♂ (wsf) North Shan States. Type B.M.

The white band is comparatively broad, being 3–4 mm. wide in space 3 in the dsf, narrower and sullied in the wsf.

Hab. Bhamo to Dawnas. Examples from N. Siam show an approach to subsp. *mallus*.

4. *M. gaesa* (Nic.)(a) subsp. *gaesa* (Nic.).

*Gerydus gaesa* de Nicéville, 1895. ♂ N.E. Sumatra.

There is no swelling along v 4 on F.

Hab. Malaya and Sumatra.

(b) subsp. *carrinas* (Fruh.).

*Gerydus learchus carrinas* Fruhstorfer, 1915b. ♂ S. Borneo. Type B.M.

v 4 on F is weakly swollen. The ♂ genitalia were figured by Corbet (1939) as *M. boisduvali heraeon*.

Hab. Borneo.

5. *M. nymphis* (Fruh.)(a) subsp. *porus* subsp. n.

A small subsp., in which the wsf and dsf are barely separable—an unusual feature in the genus in Upper Burma.

♂ superficially intermediate between subsp. *nymphis* and *eneus*, but smaller (♂ F 12–15 mm. compared to 15–18 mm. in the latter two subsp.). The white F band usually fills the outer  $\frac{1}{2}$  of the cell, and v 4 is weakly swollen in all examples seen from the type locality. The aedeagus is shorter, stouter and blunter than in the other subsp.

♀ the white F band is considerably broader than in the ♂, usually filling half the cell.

Hab. North Shan States and Karen Hills. Described from 7 ♂ 21 ♀ Karen Hills and 2 ♀ Ruby Mines (including holotype ♂ and allotype ♀ Karen Hills, 20.v.1916 (F. M. Mackwood)).

*nymphis* also occurs in a more variable form in Tenasserim and Peninsular Siam, examples from these localities being provisionally placed under subsp. *porus*. Normally the ♂ has v 4 unswollen, but there is in B.M. a ♂ from Mergui (King Is., i.1926 (W. H. Evans)) which has v4 strongly swollen, as in *chinensis*, and slightly aberrant genitalia (see fig. 5). This may be a good sp., but more material is necessary to settle the point.

The B.M. also has single ♀ ♀ of *nymphis* from S. India (Coorg, 16.iii.1929 (J. A. Yates)) and Hainan (Mt. Wuchi, v.1903), which are also provisionally placed under *porus*, though more material will almost certainly show that they represent distinct subsp. The S. Indian ♀ is closest to subsp. *fictus* on Up and to subsp. *porus* on Un, though differing from the latter in that the white discal area on UnF is sullied. The Hainan ♀ is also closest to *fictus* on Up, but the Un is unusually pale and the cilia on H are almost white.

(b) subsp. *fictus* Cbt.

*Miletus fictus* Corbet, 1939. ♂ ♀ Malaya. Types B.M.

A large subsp. (♂ F 16–19 mm.). In the ♂ v 4 on F is unswollen and the white band is narrow, at most barely entering the cell. 3 ♂ from the Battak Mountains in N.E. Sumatra are variable, but all have the F band sullied, outwardly rather straight and oblique and narrowing markedly towards the tornus. A similar tendency towards a narrow, sullied band is shown in N.E. Sumatra by *M. biggsii*.

Hab. S.E. Peninsular Siam, Malaya, N.E. Sumatra.

(c) subsp. *nymphis* (Fruh.).

*Gerydus biggsi nymphis* Fruhstorfer, 1913. ♂ nec "♀" W. Sumatra. Type B.M.

One out of 8 ♂ examined has v 4 on F weakly swollen. Differs from the preceding subsp. in having a broader white F band, which fills about  $\frac{1}{2}$  of the cell in the ♀, and in being paler and more unicolourous on Un.

Hab. W. Sumatra.

(d) subsp. *eneus* subsp. n.

♂ has v 4 on F weakly swollen in all the examples seen. The white F band is exceptionally wide, filling the outer half of the cell, whilst the basal half of the cell is pale brown. Un resembles subsp. *nymphis*.

In the ♀ the white F band is separated from the base only by a very narrow area of grey brown scales. In other respects resembles the ♂.

Hab. S.E. Sumatra. Described from 4 ♂ 6 ♀ (including holotype ♂ and allotype ♀ Liwa 900–1,400 m., 1890 (W. Doherty)).

6. *M. zinckenii* C. & R. Feld.

(a) subsp. *zinckenii* C. & R. Feld.

*Miletus zinckenii* C. & R. Felder, 1865. ♂ Java. Type B.M.

Hab. Java.

(b) subsp. *improbis* (H. H. Druce).

*Gerydus improbis* H. H. Druce, 1896. ♂ ♀ N. Borneo, Kina Balu.

The black apical border on UpF is narrower than in *zinckenii* and v 2 is not dark dusted in the outer part of the white band.

Hab. N. Borneo.

7. *M. gopara* (Nic.)

Originally described as a good species, de Nicéville later sank *gopara* as probably a synonym of *biggsii*, in which all subsequent authors have followed him. This is surprising, since there is never any difficulty in separating these two species, the outwardly straight and oblique outer edge of the lower part of the white band on UpF in the ♂ and the strongly caudate H in the ♀ being unique features in the genus. I have not seen the type, which may be in the Indian Museum, Calcutta, and no figure was published. Nevertheless the reference in the original description to the clear white F band and the more strongly marked Un, as compared with *biggsii*, leaves no doubt that de Nicéville was describing the species dealt with as *gopara* in this paper.

There are four subspp.

(a) subsp. *gopara* (Nic.).

*Gerydus gopara* de Nicéville, 1890. ♂ Perak.

syn. *Gerydus b. biggsii* f. *denticulata* Fruhstorfer, 1913. syn.n. ♀ N.E. Sumatra. Type B.M.

The white F band is comparatively narrow, at most entering only the outer 1/6 of the cell in the ♂.

Hab. Malaya (including Tioman Is.) and N. Sumatra.

(b) subsp. *pardus*, subsp. n.

♂ ♀ differs from all other subspp. by the great extent of the white F band, which is separated from the base only by a little pale greyish-brown scaling.

Hab. West Central and S. Sumatra. Described from 2 ♂ West Central Sumatra (including holotype ♂ Lebong Tandai 3,500', vii.1923 (C. J. Brooks)) and 2 ♂ 1 ♀ S.E. Sumatra (including allotype ♀ Liwa 900–1,400 m., 1890 (W. Doherty)).

(c) subsp. *eustatius* (Fruh.).

*Gerydus biggsii eustatius* Fruhstorfer, 1913. ♂ N. Borneo. Type B.M.

Intermediate between *gopara* and *pardus*, the white F band filling about half the cell.

Hab. Borneo. Examples from the Natuna Is. and Pulo Laut have the white band averaging a little narrower than Bornean examples.



(d) subsp. *artaxatus* (Fruh.).

*Gerydus biggsi artaxatus* Fruhstorfer, 1913. ♂ ♀ W. Java. Types B.M.

syn. *Gerydus biggsi artaxatus* f. *oichalia* Fruhstorfer, 1913. ♂ ♀ W. Java. Types B.M.

Hardly differs from subsp. *gopara*, but is a little browner on UnH.  
Hab. Java.

8. *M. valeus* (Fruh.).

*Gerydus zinckenii valeus* Fruhstorfer, 1913. ♀ N.E. Sumatra. Type B.M.

syn. *Gerydus zinckenii pallaxopas* Fruhstorfer, 1913. syn.n. ♂ Selangor. Type B.M.

Hab. Malaya and N.E. Sumatra. A very rare species.

9. *M. gaetulus* (Nic.)(a) subsp. *gaetulus* (Nic.).

*Gerydus gaetulus* de Nicéville, 1894. ♀ N.E. Sumatra, Battak Mts.

The original figure depicts a ♀ with a light dusting of pale brown scales on UpH. The B.M. possesses a similar ♀ from the Battak Mts., but other ♀ ♀ from the same locality are without this dusting. The ♂ appears to be unknown.

Hab. N.E. Sumatra.

(b) subsp. *innocens* (H.H. Drc.).

*Gerydus innocens* H. H. Druce, 1895. ♂ ♀ N. Borneo, Mt. Kina Balu.

♂ ♀ never with light brown dusting on UpH.

Hab. S. Sumatra and Borneo.

(c) subsp. *aphytis* (Fruh.).

*Gerydus gaetulus aphytis* Fruhstorfer, 1913. ♂ ♀ Nias. Types B.M.

A small subsp. with narrow black apical border.

Hab. Nias.

10. *M. boisduvali* Mre.

Despite the large number of subsp. which have been attributed to this species, I can only distinguish two valid and one doubtfully valid subsp.

(a) subsp. *boisduvali* Mre.

*Miletus boisduvali* Moore, 1857. ♀ Java. Type B.M.

syn. *Gerydus vincula* H. H. Druce, 1895. syn.n. ♂ ♀ Borneo. Types B.M., the ♀ allotype being a specimen of *M. gaesa carrinas* (Fruh.).

syn. *Gerydus boisduvali heraeon* Fruhstorfer, 1915b. syn.n. ♂ ♀ W. Borneo. Types B.M., the ♀ allotype being a specimen of *M. drucei metrovius* (Fruh.).

syn. *Gerydus courvoisieri courvoisieri* Fruhstorfer, 1915a. ♂ Java.

syn. *Gerydus boisduvali oxylus* Fruhstorfer, 1915b. syn.n. ♂ ♀ Bawean. Types B.M.

syn. *Gerydus boisduvali lombokianus* Fruhstorfer, 1913. syn.n. ♂ ♀ Lombok. Types B.M.

syn. *Gerydus boisduvali* var. *acragas* Doherty, 1891b. ♂ ♀ Sumba.

syn. *Gerydus buruensis* Holland, 1900. syn.n. ♂ ♀ Buru.

syn. *Miletus ceramensis* Ribbe, 1889. syn.n. ♀ Ceram.

syn. *Gerydus boisduvali dossemus* Fruhstorfer, 1913. syn.n. ♂ ♀ Obi. Types B.M.

syn. *Gerydus stygianus* Butler, 1884. syn.n. ♂ Ternate. Type B.M.

syn. *Gerydus boisduvali adeus* Fruhstorfer, 1913. syn.n. ♂ New Guinea, Fak Fak. Type said to be in Adams Coll., but appears to be lost.

The ♀ usually has a well defined white patch on UpF beyond end cell in spaces 5, 4 and 3 and small sullied conjoined spots in spaces 2 and 1b, but occasionally all the white markings are almost obliterated by brown scaling.

Hab. Throughout the Archipelago from Sumatra, Banka and Borneo in the west to New Guinea in the east, except for the areas occupied by the two following subsp.

(b) subsp. *diotrophes* (Fruh.).

*Gerydus boisduvali diotrophes* Fruhstorfer, 1913. ♂ ♀ East Celebes. Types B.M.

A doubtfully valid subsp., in which in the ♀ the white spots in spaces 2 and 1b on UpF are larger and better defined than in subsp. *boisduvali*.

Hab. Celebes. Examples from the Sula Is., which might be expected to agree fairly closely, do not differ from subsp. *boisduvali*.

(c) subsp. *avitus* (Fruh.).

*Gerydus boisduvali avitus* Fruhstorfer, 1915b. ♂ ♀ Key Is. Types B.M.

The ♀ has a well defined, continuous and more or less even white band on UpF. Very occasionally the ♂ shows traces of white markings on UpF.

Hab. Timor and Key Islands.

11. *M. drucei* (Semp.)

The two subsp. listed below are doubtfully valid, the difference lying only in a mean of characters. Both sexes show great graded individual variation, on the same lines as *M. biggsii biggsii* which has been discussed on p. 157. In the ♂ the F may be unmarked (*jacchus*, *epidurus*) or may have a diffuse whitish area beyond-end cell (*paianius*) or may have a white band which always begins to develop at the extreme base of space 2; this band may be sullied at its lower end (*phradimon*) or clear white (*drucei*, *metrovius*). The ♀ usually has a rather circular white patch beyond end cell (*philippus*), but this may extend into a white band as in the ♂.

(a) subsp. *drucei* (Semp.).

*Gerydus drucei* Semper, 1888. ♂ Bohol.

syn. *Miletus philippus* Staudinger, 1889. syn.n. ♀ Palawan.

syn. *Gerydus boisduvali jacchus* Fruhstorfer, 1913. syn.n. ♂ ♀ Luzon.

syn. *Gerydus boisduvali paianius* Fruhstorfer, 1913. syn.n. ♂ Mindoro. Type should be in B.M., but appears to be lost.

syn. *Gerydus boisduvali epidurus* Fruhstorfer, 1913. syn.n. ♂ Palawan. Type B.M.

In ♂ ♂ in which the white markings on UpF are absent or reduced there is on UnF at most only a poorly marked whitish area confined to spaces 2 and 1b.

Hab. Philippines, including Palawan.

(b) subsp. *metrovius* (Fruh.).

*Gerydus biggsii metrovius* Fruhstorfer, 1913. ♂ ♀ N. Borneo. ♂ type B.M.

syn. *Gerydus courvoisieri phradimon* Fruhstorfer, 1915a. syn.n. ♂ N. Borneo. Type B.M.

Even in poorly marked ♂ ♂ the whitish area on UnF extends above v 3.

Hab. Borneo.

12. *M. biggsii* (Dist.)(a) subsp. *biggsii* (Dist.).

*Gerydus biggsii* Distant, 1884. ♀ Malaya.

syn. *Gerydus b. biggsii f. atomaria* Fruhstorfer, 1913. ♂ Rhio Archipelago. Type B.M. A ♀ in B.M. from the Battak Mountains, which is also labelled as a "type" of *atomaria*, is a specimen of *M. nymphis fictus* Cbt.

syn. *Gerydus boisduvali xeragis* Fruhstorfer, 1915b. syn.n. ♀ Singapore. Type B.M.

syn. *Gerydus boisduvali hyllus* Fruhstorfer, 1915b. syn.n. ♂ N.E. Sumatra. Type B.M.

syn. *Gerydus biggsii sebethus* Fruhstorfer, 1915b. syn.n. ♂ W. Borneo. Type B.M.

syn. *Gerydus biggsii extraneus* Toxopeus, 1929. syn.n. ♂ Pulo Weh.

Individual variation in this species has already been discussed (p. 157). The names *biggsii* and *sebethus* are referable to the end of the cline in which the white band on UpF is well developed, and *hyllus* to the opposite end of the cline; *atomaria*, *xeragis* and *extraneus* refer to examples from the central portion of the cline.

Hab. S. Burma (Victoria Pt.), Malaya, Sumatra, Borneo. 2 ♂ 2 ♀ in B.M. from "Java" (no further data) are probably wrongly labelled.

(b) subsp. *natunensis* (Fruh.).

*Gerydus biggsii natunensis* Fruhstorfer, 1915b. ♀ Natuna Is.

In both sexes the white band on UpF is broader than in subsp. *biggsii*, sometimes reaching the costa and filling the outer  $\frac{1}{4}$  of the cell.

Hab. Natuna Is.

(c) subsp. *niasicus* (Fruh.).

*Gerydus biggsii niasicus* Fruhstorfer, 1913. ♂ ♀ Nias. Types B.M.

syn. *Gerydus biggsii batunensis* Fruhstorfer, 1913. syn.n. ♀ Batu Is. Type B.M.

Very similar to the preceding subsp., but smaller and there is often a dark bar end-cell on UpF.

Hab. Nias and Batu Is.

(d) subsp. *albotignula* (Van Eecke).

*Gerydus boisduvali albotignula* Van Eecke, 1914. ♀ Simalur.

syn. *Gerydus boisduvali simalurensis* Toxopeus, 1928. ♂ ♀ Simalur.

In the ♂ the white band is more restricted than in any other subsp., being confined to a sullied streak in space 2 conjoined basally to a narrow discal patch in spaces 3 and 4. The ♀ does not appear to differ from poorly marked examples of subsp. *biggsii*. Not represented in B.M., and known to me only from the original descriptions and Van Eecke's figure.

Hab. Simalur.

13. *M. cellarius* (Fruh.)

*Gerydus biggsii cellarius* Fruhstorfer, 1913. ♂ ♀ N. Borneo, Mt. Kina Balu. Types B.M.

There is a very large series in B.M. taken by Waterstradt on Kina Balu, and several older examples labelled "Brunei". The latter cannot definitely be ascribed to any particular part of N. Borneo, as in the 19th century Brunei was not used in its present restricted geographic sense. I think it unlikely that *cellarius* is merely a montane form of *biggsii*, as Corbet supposed.

Hab. N. Borneo.

14. *M. symethus* (Cr.)(a) subsp. *petronius* (Dist. and Pryer).

*Gerydus petronius* Distant and Pryer, 1887. ♀ N. Borneo, Sandakan.

syn. *Gerydus symethus diopethes* Fruhstorfer, 1913. syn.n. ♂ Rhio Archipelago, ♀ "ex Musco Singapore". Types B.M.

syn. *Gerydus symethus hieropous* Fruhstorfer, 1915b. syn.n. ♂ ♀ Brunei.

probable syn. *Gerydus symethus bangkanus* Fruhstorfer, 1914. ♂ Banka. The "type" in B.M. is a ♀. I have seen no ♂ from Banka.

On UpF the ground colour is white with bluish-grey scaling at the base. The H is normally uniform bluish-grey, but there is sometimes a paler area at end-cell and in spaces 4 and 5.

Hab. Malaya, Rhio Archipelago, Natuna Is., Borneo, Pulo Laut, probably Banka. 1 ♂ 1 ♀ in B.M. from Peninsular Siam, Renong (opposite Victoria Point) are paler and possibly constitute a further subsp. Recorded from Burma by Evans (1932) and others, probably in error. B.M. has no Burmese examples.

(b) subsp. *acampsis* (Fruh.).

*Gerydus symethus acampsis* Fruhstorfer, 1913. ♂ ♀ N.E. Sumatra. Types B.M.

On average much darker than the preceding subsp. of which it should perhaps be regarded as a modification, since some examples from the East Coast of Sumatra do not differ. In the ♂ type the ground colour on UpF is all blackish-grey, except for an ovate white spot beyond end-cell and a whitish streak in space 1b.

Hab. N. Sumatra.

(c) subsp. *nuctus* subsp. n.

A large and very pale subsp. ♂ ♀ Up ground colour white with pale bluish-grey scaling at base F, and at base cell and narrowly along termen and dorsum H. Nearest to subsp. *vespasianus* from Nias, but larger (♂ F 18–22 mm. compared to 16–18 mm. in latter), grey scaling on H a little more extensive and UnH more variegated, with discal band often inwardly bordered by a narrow black area.

Hab. West Central to South Sumatra. Described from 4 ♂ 3 ♀ S.E. Sumatra (including holotype ♂ and allotype ♀ Liwa, 900–1,400 m., 1890 (*W. Doherty*)). 1 ♂ Padang Bovenland, 2 ♂ Korinchi, 1 ♀ Lebong Tandai, 2 ♀ S.W. Sumatra, 4 ♀ Sumatra, 1 ♀ "N. Borneo".

(d) subsp. *symethus* (Cr.).

*Papilio symethus* Cramer, 1779. ♀ "West Indies" recte Java.

syn. *Symetha pandu* Horsfield, 1828. ♂ ♀ W. Java. Types B.M.

The ♂ hardly differs from subsp. *acampsis*, but the ♀ is much paler, and nearly always has a prominent whitish patch beyond end-cell on UpH.

Hab. W. Java.

(e) subsp. *perlucidus* (Fruh.).

*Gerydus symethus perlucidus* Fruhstorfer, 1913. ♂ ♀ E. Java. Types B.M.

syn. *Gerydus symethus megaris* Fruhstorfer, 1913. syn.n. ♂ ♀ Lombok. Types B.M.



Paler than subsp. *symethus*, especially in the ♂ which usually has a prominent whitish streak beyond end-cell on UpH. There is slight seasonal differentiation in this but no other subsp. of *symethus*, the dsf being a little paler than the wsf. It should perhaps be regarded as a modification of subsp. *symethus*, since variation in Java from west to east is clinal. There is no justification for separating examples from Lombok, where the species has probably become established very recently.

Hab. E. Java, Bali, Lombok.

(f) subsp. *vespasianus* (Fruh.).

*Gerydus symethus vespasianus* Fruhstorfer, 1913. ♂ ♀ Nias. Types B.M.

The smallest and palest subsp.

Hab. Nias.

(g) subsp. *batuensis* (Fruh.).

*Gerydus symethus batuensis* Fruhstorfer, 1914. ♂ Batu Is. Type B.M.

♂ differs from subsp. *petronius* only in that there is a fairly well pronounced whitish patch on UpH in and beyond end-cell. ♀ unknown. It is a little surprising that this subsp. bears no resemblance to subsp. *vespasianus*.

Hab. Batu Is.

(h) subsp. *edonus* (Fruh.).

*Gerydus symethus edonus* Fruhstorfer, 1913. ♀ Palawan. Type B.M.

The ♂ hardly differs from *acampsis* ♂ and the ♀ from *perlucidus* ♀.

Hab. Palawan.

(i) subsp. *philopator* (Fruh.).

*Gerydus symethus philopator* Fruhstorfer, 1914. ♂ Mindoro. Type B.M.

Both sexes hardly differ from dark examples of subsp. *acampsis*.

Hab. Mindoro and probably Luzon and other islands. Most B.M. examples are merely labelled "Philippines".

(j) subsp. *hierophantes* (Fruh.).

*Gerydus symethus hierophantes* Fruhstorfer, 1915b. Sulu Is. Sex not stated.

I have seen no examples from the type locality. In his description Fruhstorfer draws attention to the very washed out undersurface. A ♀ in B.M. labelled from "N. Borneo, Sandakan" appears to belong to this subsp. On UpF the ground colour is white with the basal half of the cell dark bluish grey. The UpH is dark brown except for a white discal patch at end cell and in spaces 4 and 5, and there is no trace of the bluish grey scaling found in all other *symethus* subsp. On Un the ground colour is very pale reddish white, with pale reddish brown markings. There is also in B.M. 1 ♂ 1 ♀ from Mindanao, which appear to be allied to this subsp. On Up the ♀ hardly differs from the ♀ from "Sandakan", while in the ♂ the white discal patch on UpH extends to the dorsum. The Un is dusky brown with dark red brown markings, contrasting strikingly with the washed-out appearance of the ♀ from "Sandakan".

Hab. It seems possible that *hierophantes* is a good sp, occurring in at least two subspp. from N. Borneo through the Sulu Is. to Mindanao, but more material is needed to settle this point.

15. *M. gallus* (Nic.)(a) subsp. *gallus* (Nic.).

*Gerydus gallus* de Nicéville, 1894. ♀ N.E. Sumatra, Battak Mts. Type B.M.

♂ ♀ UpF the white band is comparatively narrow, at most barely entering the cell, and the basal area is dark brown.

Hab. Malaya and N. Sumatra.

(b) subsp. *leucocyon* (Tox.).

*Gerydus gallus leucocyon* Toxopeus, 1940. ♂ ♀ Java.

The white band is broader, filling the outer  $\frac{1}{4}$  of cell, and the basal area is grey brown.

Hab. Java.

16. *M. heracleion* (Doh.)(a) subsp. *heracleion* (Doh.).

*Gerydus heracleion* Doherty, 1891a. ♂ Perak. ♂ type and ♀ neallotype in B.M.

A small subsp. (F 19–20 mm.), with the white band comparatively narrow on UpF, filling outer  $\frac{1}{5}$  of cell. On UnF the white band is divided by dark dusting along vs 3 and 4.

Hab. Malaya.

(b) subsp. *arion* subsp. n.

♂ ♀ larger than *heracleion* (F 20–23 mm.), with the white band on UpF wider, filling outer  $\frac{1}{3}$  of cell. On UnF the white band is constricted at vs 3 and 4, but is not completely divided.

Hab. Borneo and Pulo Laut. Described from 2 ♂ 2 ♀ North Borneo (including holotype ♂ N. Borneo (ex Joicey coll.) and allotype ♀ Mt. Kina Balu (no further data) ) and 1 ♀ Pulo Laut.

17. *M. ancon*. (Doh.)(a) subsp. *siamensis* (Godfrey)

*Gerydus ancon siamensis* Godfrey, 1916. ♂ E. Siam. Type B.M.

A large subsp. (♂ F 24–26 mm.), with the white band on UpF always divided by a broad dark area astride v 3.

Hab. E. Siam. Examples from N. and N.W. Siam are intermediate to subsp. *ancon*.

(b) subsp. *ancon* Doherty, 1889. ♂ ♀ Tavoy.

A small subsp. (♂ F 19–23 mm.), with the white band on UpF not usually completely divided, though it is always constricted at v 3. The UpH is often whitish, most often in the dsf ♀.

Hab. Burma, Shan States and Karen Hills to Tavoy.

(c) subsp. *gigantes* (Nic.).

*Gerydus gigantes* de Nicéville, 1894. ♂ ♀ N.E. Sumatra, Battak Mts.

A highly aberrant subsp., or possibly a good sp. ♂ ♀ Up all white except for dark apex F and costa H.

Hab. Malaya and Sumatra. Unlike most spp. of *Miletus*, there is no difference between examples from N. and S. Sumatra.

(d) subsp. *gigas* (H. H. Drc.).

*Gerydus gigas* H. H. Druce, 1895, ♂ ♀ N. Borneo, Mt. Kina Balu.

syn. *Gerydus ancon anconides* Fruhstorfer, 1913. syn.n. Sarawak. Sex not stated.

A large subsp. (F 21–26 mm.), with the white band broader than in subsp. *ancon*, and seldom completely divided. UpH always plain brown.

Hab. Borneo

18. *M. archilochus* (Fruh.)

*Gerydus archilochus* Fruhstorfer, 1913, ♂ ♀ Central Tonkin. Types B.M.

Hab. Represented in B.M. only by the types and 1 ♂ from the type locality.

19. *M. leos* (Guér.)

A unique feature of this species is that the white markings on UpF are, on average, smaller in the ♀ than in the ♂, whereas in all other species the reverse applies.

(a) subsp. *teos* (Doh.).

*Gerydus teos* Doherty, 1891b, ♂ ♀ Sumba.

In the ♂ the white band on UpF is wide, filling the outer 1/3 of cell, with its inner edge rather straight and oblique. In the ♀ the white band may resemble that of the ♂, but is usually slightly constricted at v 3. Un pale greyish buff.

Hab. Sumba, ? Sumbawa.

(b) subsp. *florensis* (Fruh.).

*Gerydus leos florensis* Fruhstorfer, 1913, ♂ ♀ Flores.

syn. *Gerydus leos eulus* Fruhstorfer, 1913. syn.n. ♂ ♀ Sumbawa.

In the ♂ the white band is entire, but is narrower than in subsp. *teos*, barely entering the cell. In the ♀ the white band is interrupted by a dark area astride v 3. Un resembles *teos*.

♂ ♀ in B.M. labelled as the "types" of *eulus* agree with specimens of *M. leos aronicus*, and cannot possibly have come from Sumbawa. Fruhstorfer's original description of *eulus* is brief and rather unrevealing, but later (1914) he referred examples from Pura, Adonara and Alor to *eulus*. Long series in B.M. from these three islands do not differ from examples from Flores. I have seen no authentic examples from Sumbawa, whence Doherty recorded *teos*. In the circumstances it seems best to relegate *eulus* as a synonym of *florensis*, although it has line priority over the latter.

Hab. Flores, Pura, Adonara, Alor, ? Sumbawa.

(c) subsp. *tellus* (Fruh.).

*Gerydus ancon tellus* Fruhstorfer, 1913, ♂ ♀ "E. Java", later (1914) corrected to "probably Wetter". Types B.M.

A small subspecies (♂ F 18 mm.) with the white band intermediate in character between *teos* and *florensis*.

Hab. Uncertain. Apart from the types, the B.M. has only 1 ♀ from Tana Djampea. This ♀ has the Un slightly paler than the allotype ♀. I think it much more probable that the types came from Sumbawa, or one of the many small islands lying between Celebes and the main chain of the Lesser Sunda Is., than from Wetter.

(d) subsp. *catoleucos* (Fruh.).

*Gerydus leos catoleucos* Fruhstorfer, 1913. ♂ ♀ Salayer.

A ♂ in B.M. is doubtfully regarded as the type.

Differs only from subsp. *maximus* from the adjacent mainland of Celebes by the very pale whitish buff Un, with weakly contrasted markings.

Hab. Salayer. A series in the B.M. from Toekan Besi Is. are similar, but average smaller.

(e) subsp. *maximus* (Holl.).

*Gerydus maximus* Holland, 1890. ♂ ♀ S. Celebes.

syn. *Gerydus leos maximus* f. *divisa* Fruhstorfer, 1913. ♂ S. Celebes. Type B.M.

syn. *Gerydus leos sarus* Fruhstorfer, 1913. syn.n. ♂ ♀ E. Celebes. Types B.M.

In the ♂ the white band on UpF shows graded individual variation. It may be entire, though constricted at v 3 (*maximus*), or divided into two portions by a dark area astride v 3 (*divisa*, *sarus*), in extreme forms the two portions being reduced to a small oval white spot surrounding the thickened portion of v 4 and small sullied post-discal spots in spaces 2 and 1b. In the ♀ the white band, at its widest, is almost divided at v 3 and at its most reduced is even smaller and more sullied than in the ♂ Un both sexes grey brown to buff brown.

Hab. Celebes (except Minahassa) and Bouton.

(f) subsp. *vaneeckei* (Tox.).

*Gerydus symethus vaneeckei* Toxopeus, 1930. ♂ ♀ N.E. Celebes, Minahassa.

In the ♂ the white band is always entire and fairly broad, usually just entering the cell, with its inner edge rather diffuse and vs 2 and 3 and the outer part of space 2 often sullied. The ♀ may resemble the ♂, but more often is rather similar to broad-banded *maximus* ♀. Un both sexes usually browner, with more contrasted markings, than *maximus* (but some examples in B.M. from Talaut, taken at the same time as normal examples, have Un dirty whitish with all markings entirely obsolete).

Hab. N.E. Celebes, meeting and merging with subsp. *maximus* in the Gorontalo area. Also Sangir and Talaut.

(g) subsp. *mangolicus* (Fruh.).

*Gerydus leos mangolicus* Fruhstorfer, 1913. ♂ Sula Mangoli. Type B.M.

In the ♂ the white band is broad, undivided and clearer white, filling outer 1/3 of cell. The ♀ resembles *maximus* ♀. Un resembles *maximus*.

Hab. Sula Is.



(h) subsp. *virtus* (Fruh.).

*Gerydus leos virtus* Fruhstorfer, 1913. ♂ Batchian. Type B.M.

syn. *Gerydus leos pentheus* Fruhstorfer, 1913. ♂ ♀ Halmahera. Types B.M., the ♀ being labelled "Batchian".

Occurs in two well-defined forms, which Fruhstorfer regarded, probably incorrectly, as seasonal. Intergrades are very rare. In f. *virtus* the ♂ has a broad white unsullied band, which usually fills about  $\frac{1}{3}$  to  $\frac{1}{2}$  of the cell, whilst the ♀ has the white band constricted or divided at v 3; in both sexes the Un is pale whitish buff, with contrasted markings, especially in the ♀. In f. *pentheus* the ♂ has the white band narrower, with the part in spaces 1 and 2 sullied or obsolete, whilst the ♀ is unmarked brown on Up and reddish brown on Un without any trace of the usual discal white markings on UnF. Both forms seem to occur in equality in Batchian and Obi, but in Halmahera f. *pentheus* seems to be much the scarcer of the two.

Hab. N. Moluccas.

(i) subsp. *leos* (Guér.).

*Symethis leos* Guérin-Ménéville, 1830. ♀ Buru (fig. only). The text description of the "♂", published a year after the fig. of the ♀, can only apply to the ♀ of *M. boisduvali* Mre.

syn. *Gerydus boisduvalii* Butler, 1884 (praeocc. by *boisduvali* Mre. 1857). ♂ ♀ Amboina. Types B.M.

syn. *Gerydus leos meronius* Fruhstorfer, 1913. syn.n. ♀ Ceram. Type B.M.

syn. *Gerydus leos amphiarus* Fruhstorfer, 1913. syn.n. ♀ "Banggai" loc. err. Type B.M.

syn. *Gerydus leos gardineri* Fruhstorfer, 1914. syn.n. ♂ ♀ Amboina. Types B.M.

The most variable of all the *leos* subsp., especially on Un which shows a mingling of the characters of the Celebes and Papuan subsp. The ♂ resembles subsp. *virtus* f. *virtus* on Up but the white band is wider, usually filling about  $\frac{1}{2}$  of the cell. The ♀ is very variable; the white band may be as wide as the ♂, or constricted at v 3 or divided. ♂ ♀ UpH veins often whitish, and occasionally nearly all H may be dusted whitish. Un ♂ ♀ very variable, some examples being inseparable from subsp. *maximus*; others, in particular ♀ ♀ and specimens from Ceram Laut and the other small islands S.E. of Ceram, are whitish buff with contrasted markings. Every sort of intergrade occurs, and no particular "form" appears to be confined to any one island.

Hab. S. Moluccas.

(j) subsp. *aronicus* (Fruh.).

*Gerydus leos aronicus* Fruhstorfer, 1914. Aru Is. Type (sex not stated) said to be in B.M., but appears to be lost.

syn. *Gerydus leos rex* Fruhstorfer, 1913 nec Boisduval, 1832. Waigeu. (Boisduval's *Symoetha rex* is not a *Miletus* species at all).

syn. *Gerydus leos nineyanus* Fruhstorfer, 1914. syn.n. ♂ New Guinea, Niney. Type said to be in B.M., but appears to be lost.

syn. *Gerydus leos acrisius* Fruhstorfer, 1914. syn.n. New Guinea, Kupaur.

♂ ♀ very similar to subsp. *leos*, but on UpH the white dusting does not occur in the ♂ and in the ♀, if present, is inconspicuous and confined to the veins. Un paler, on average, than subsp. *leos*, most ♂ ♂ being pale lavender buff with weakly contrasted markings.

Hab. Aru Is., Mysol, Waigeu and New Guinea.

20. *M. celinus* sp.n.

♂ Up plain brown except, occasionally, for a pale brown post-discal streak in space 1b. The basal portion of v 4 on UpF is thickened, as in all spp. of the *symethus* group. Un resembles *M. leos maximus*, but the ground colour is usually a little browner. The most striking feature is the shape of the F, which is broad, with a strongly convex termen and a small hook at the apex. The genitalia (see fig.) differ from other spp. of the *symethus* group in the dilated distal end of the aedoeagus and the unusually long and narrow terminal hook of the clasp. F 19–20 mm.

♀ Up may be all brown, but on UpF there is usually a small whitish patch beyond end-cell and a small whitish post-discal spot in space 1b. Wing shape and Un as in the ♂. F 19–20 mm.

Hab. S. Celebes. Described from 9 ♂ 8 ♀ (including holotype ♂ and allotype ♀ S. Celebes, viii-ix.1891 (W. Doherty)).

21. *M. melanion* C. & R. Feld.

There are three weakly differentiated subsp., which should perhaps be regarded only as modifications of the typical form, since variation appears to be clinal from north to south. The material in the B.M. is, however, not very comprehensive.

(a) subsp. *melanion* C. & R. Feld.

*Miletus melanion* C. & R. Felder, 1865. ♂ Luzon. Type B.M.

syn. *Gerydus melanion euphranor* Fruhstorfer, 1913. syn.n. ♂ ♀ Mindoro. Types B.M.

In the ♂ there is no whitish area on UpF surrounding the thickened portion of v 4. In the ♀ the white band on UpF is always divided by a broad brown area (2–3 mm. wide) in spaces 2 and 3 and never reaches the costa.

Hab. In B.M. only from Luzon and Mindoro.

(b) subsp. *vitellianus* (Fruh.).

*Gerydus melanion vitellianus* Fruhstorfer, 1913. ♀ Mindanao. Type B.M.

The ♂ may have a narrow oval whitish area surrounding the thickened portion of v 4. ♀ UpF brown area in spaces 2 and 3 narrower (1–2 mm. wide) and upper portion of white band may reach costa.

Hab. Mindanao.

(c) subsp. *bazilanus* (Fruh.).

*Gerydus melanion bazilanus* Fruhstorfer, 1913. ♂ ♀ Bazilan. Types B.M.

In the ♀ the white band is usually undivided and reaches the costa.

Hab. Bazilan.

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